PATENT ABSTRACTS OF JAPAN

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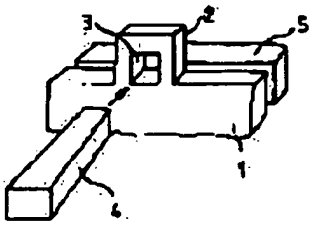
(54) LIQUID CRYSTAL DISPLAY DEVICE

(57)Abstract:
PURPOSE: To provide a liquid crystal display device improved in assembly workability by substantially preventing breaking or cutting of the ends of lugs of a frame enclosing the periphery of the image display part of a liquid crystal display element for fixing auxiliary members, such as printed circuit boards, to the rear of the liquid crystal display element at the time of overhaul, etc.
CONSTITUTION: The lugs 2 projecting from the frame 1 enclosing the periphery of the image display surface of the liquid crystal display element beyond its rear surface are respectively provided with holes 3 in order to retain and fix the auxiliary members, such as printed circuit boards 5, to be arranged on the rear of the liquid crystal display element in the peripheries of the near surface. Convergent pins 4 are inserted into the respective holes from the outer side of the periphery and the peripheries of the rear surface of the auxiliary members are retained by the end sides of the pins past these holes to fix the auxiliary members to the rear surface of the liquid crystal display element.



LEGAL STATUS

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CLAIMS

[Claim(s)]
[Claim 1] Since it presses down and fixes around the tooth back, attached members, such as a printed circuit board arranged behind a liquid crystal display component Near the edge of the pawl which projects across the above-mentioned tooth back from the frame surrounding the circumference of the image display side of a liquid crystal display component The liquid crystal display which prepares a hole, respectively and is characterized by having inserted the pin of a taper, having made the circumference of a tooth back of an attached member pressed down by the edge side of the pin which passed the hole, and making a liquid crystal display component rear face fix an attached member from a circumference outside at each hole, respectively.
[Claim 2] The liquid crystal display according to claim 1 characterized by using the hollow pin which bent and formed the plate of a metal with elasticity.
[Claim 3] The liquid crystal display according to claim 1 characterized by preparing the groove level difference section in the thick part side where the cross section of the pin of a taper became larger than the cross section of the hole of a pawl, making the cross section of the pin of a there reduce to slightly larger extent than the cross section of the hole of a pawl rapidly at least to the taper side of a pin, and making it make a ****** operation of a pin perform.
[Claim 4] The side near the image display side of the periphery section of a hole established in the pawl of a frame is a liquid crystal display according to claim 1 characterized by carrying out a location soon in an image display side from the tooth back of the attached member which should be fixed.
[Claim 5] The liquid crystal display according to claim 1 characterized by forming in the respectively almost same square the profile of the hole prepared in the cross-section profile of a pin, and the pawl of a frame.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention raises assembly-operation nature and relates to the liquid crystal display of structure convenient also for decomposition and repair.
[0002]
[Description of the Prior Art] Since attached members, such as a printed circuit board 5, are fixed behind the liquid crystal display component 6 of a liquid crystal display as rear view is shown in drawing 5 (a) and a side elevation is conventionally shown in drawing 5 (b) It cut deeply near the edge of the pawl 2 which projected in the back side of the attached member of the frame 1 surrounding the image display section of the liquid crystal display component 6, and 7 was prepared, the part from the slitting 7 of a pawl 2 to an edge was bent like a graphic display so that the circumference of a tooth back of an attached member might be held down, and the attached member was fixed. In addition, all over drawing (b), details, such as thickness of the ingredient of frame 1 the very thing, are disregarded.
[0003]
[Problem(s) to be Solved by the Invention] However, when it is necessary to disassemble a liquid crystal display with the above conventional structures, For example, since the ingredient of a turn part has hardened by an age-hardening etc. to fix even if it is going to return to the form before bending and bending the edge of the pawl of the once bent frame to hard flow It was not rare for the need of bending return being difficult, and breaking from the slitting section occasionally, going out, and exchanging the whole frame to come to arise. moreover, few [even if the relation of the thickness of an attached member and the location of the slitting section established in the pawl of a frame is delicate and it bends a top from the slitting section] clearances between the bent part and an attached member tooth back -- remaining -- with backlash -- being easy -- etc. -- there was also a problem.
[0004] Let it be a technical problem for this invention to offer the liquid crystal display which can be disassembled easily, without damaging a frame at the time of the decomposition it was made for the above problems not to produce.
[0005]
[Means for Solving the Problem] In order to solve the above-mentioned technical problem, it sets to this invention. Since it presses down and fixes around those tooth backs, attached members, such as a printed circuit board arranged behind a liquid crystal display component Near the edge of the pawl which projects across the tooth back of an attached member of the frame surrounding the circumference of the image display side of a liquid crystal display component The hole was prepared, respectively, and insert the pin of a taper in each hole, it is made to press down the tooth back of an attached member by the edge side of the pin which passed the hole, and it was made to make it fix an attached member from a circumference outside, respectively. Therefore, what bent the plate of a metal with **** and was formed in midair is used for the pin to be used so that the cross section of a pin may carry out cutback deformation elastically comparatively easily at the time of pin insertion, using what was manufactured from the wire rod. Moreover, prepare the groove level difference section in the thick part side where the

cross section of the pin of a taper became larger than the cross section of the hole of a pawl, the cross section of the pin of a there is made to reduce to slightly larger extent than the cross section of the hole of a pawl rapidly at least to the taper side of a pin, and it was made to make a ****** operation of a pin perform. Furthermore, the profile of the hole prepared in the cross-section profile and pawl of a pin was made to form in the respectively almost same square.

[0006]

[Function] If it is performed above, the point of the pawl extended from the frame circumference to the back side of the image display section will break during decomposition, and a problem which is referred to as having to exchange the whole frame will be lost. If the ingredient of a frame is made into what has comparatively high reinforcement and a pin is made from the comparatively soft ingredient which is easy to deform plastically, when a pin ingredient will be a wire rod, the cross-section configuration of a pin may deform into the hole of the pawl of a frame, and it gets used, and is hard coming to escape a pin by pushing in a pin strongly. Moreover, when the metal plate which has elasticity in a pin is bent and manufactured in midair, and pushing in a pin, a cross-section configuration deforms elastically and it becomes easy to stuff it into the hole of the pawl of a frame. However, when it is safer to escape at a pin in this case and to prepare the groove level difference section for stops and the metal plate is used, processing the above-mentioned level difference section is made to form in is easy. In addition, when it was more surely than the tooth back of the attached member which should fix the side near the image display side of the periphery section of the hole prepared in the pawl of a frame when based on this invention made to carry out the near location in an image display side and a pin is inserted in a hole, even if there is a difference slight in the dimension of a member according to the difference of a manufacture lot etc., an attached member can be certainly suppressed by the pin. In addition, since there was a possibility of becoming it easy to escape that the cross-section configuration of the pin concerning this invention is a configuration which is easy to rotate to the hole of the pawl of a frame, both sides used the cross section as about 4 angles. Even if this has a slight difference in the configuration of an angle by the hole and the pin in a triangle, it is hard coming to use it, and it is the thing of such a small dimension, and is because it will become the same with it being circular on actual if it carries out in the polygon cross section more than a rectangular head.

[0007]

[Example] In order for drawing 1 to be the 1st example of this invention, to arrange the printed circuit board 5 at the tooth back of the liquid crystal display component 6 and to make it fix, it is drawing showing the condition of having formed the hole 3 for inserting the pin 4 made into the taper in the edge of the pawl 2 extended to the back side of the frame 1 surrounding the circumference of an image display side, and drawing (a) is rear view and drawing (b) is a side elevation. Drawing 2 is the amplification perspective view of the rectangular-head drill-like pin 4 which should be inserted in near and the hole 3 of a pawl 2 of the hole 3 with the square edge of the pawl 2 of the frame 1 of the 1st example. A pin 4 is inserted in the direction of an arrow head in drawing. In this example, the frame was manufactured with the steel plate and the pin 4 was manufactured with the comparatively soft alloy containing copper etc.

[0008] Drawing 3 is drawing which is used for the 2nd example of this invention and in which showing the hollow cross section of pin 4a manufactured from the metal plate. Since it aimed at deforming easily and the cross section was made hollow as shown in drawing, the neighborhood does not need to be surrounded thoroughly, it is easy to manufacture the direction which made the cross section the shape of the shape of a KO character, and U character, and, moreover, a problem does not have an activity top, either. In the case of this example, the hole 3 of the pawl 2 of a frame 1 is a nearly completely square hole, but the direction of the cross section of pin 4a is only square in extent which is not rotated in a hole, and even if the part of an angle is considerably roundish, it does not interfere. Moreover, it is better to escape at a pin and to form the groove level difference section 8 for stops, when using pin 4a which deforms such a cross-section configuration easily. It is not necessary to manufacture strictly in this configuration and, and although drawing 4 is the side elevation showing an example of the configuration of such the level difference section, the magnitude of a level difference is slight, does not interfere, and

in short, by this level difference section, a pin cannot escape from it easily and it should just become.
[0009]
[Effect of the Invention] As explained above, according to this invention, decomposition and repair are easy, and the liquid crystal display which can reuse members, such as a frame, as they are is obtained.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] The 1st example of this invention shows the condition of yet not inserting the pin, drawing (a) is the rear view and drawing (b) is a side elevation.
[Drawing 2] It is the amplification perspective view of the rectangular-head drill-like pin which should be inserted in near and the hole of a pawl of a hole with the square edge of the pawl of the frame of the 1st example.
[Drawing 3] It is drawing showing the hollow cross section of pin 4a manufactured from the metal plate used for the 2nd example of this invention.
[Drawing 4] It is drawing which is established in pin 4a concerning the 2nd example and in which escaping and showing the groove level difference section 8 for stops.
[Drawing 5] In order to make the tooth back of the liquid crystal display component 6 fix a printed circuit board 5 with the conventional liquid crystal display, it is drawing showing the condition of having bent the part by the side of an edge from the slitting section 7 of the pawl 2 of a frame 1 to the inside, and drawing (a) is the rear view and drawing (b) is a side elevation.
[Description of Notations]
1 -- Frame 2 -- Pawl 3 -- Hole prepared near the edge of a pawl 4 4a -- Pin 5 -- Printed circuit board 6 -- Liquid crystal display component 7 -- It cuts deeply. 8 -- Groove level difference section.

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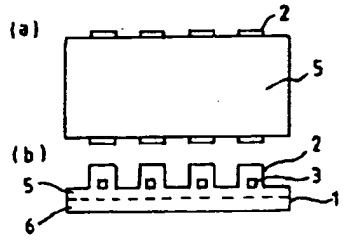
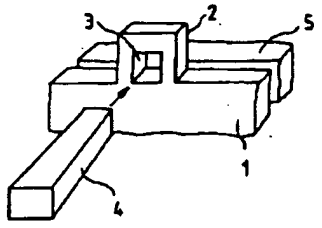
DRAWINGS

[Drawing 1]
【図 1】



[Drawing 2]
【図 2】



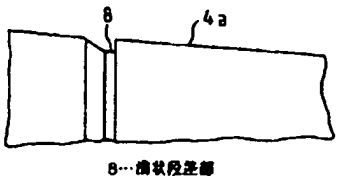
1…フレーム 2…爪 3…孔 4…ピン 5…プリント基板
6…液晶表示素子

[Drawing 3]
【図 3】

4a…断面中空のピン

[Drawing 4]

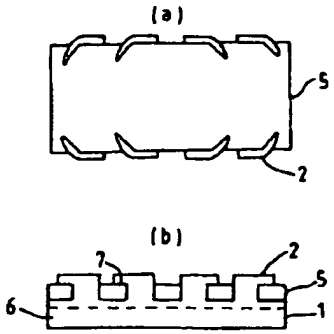
【図4】



8…楔状段差部

[Drawing 5]

【図5】



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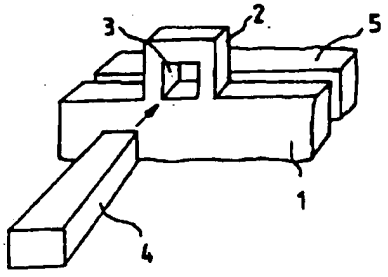
(54)【発明の名称】　液晶表示装置

(57)【要約】
【目的】液晶表示素子の画像表示部の周辺を囲むフレームの、液晶表示素子の背後にプリント基板などの付属部材を固着させるための爪の端部が、分解修理などの際に、折れたり切れたりし難くなって、組立作業性が向上した液晶表示装置を提供することにある。
【構成】液晶表示素子の背後に配置するプリント基板５などの付属部材を、その背面周辺で押さえて固定するために、液晶表示素子の画像表示面の周辺を囲むフレーム１から上記背面を越えて突出している爪２の端部の近くに、それぞれ孔３を設け、各孔に、周辺外側から、それぞれ、先細のピン４を挿入し、孔を通過したピンの端部側で付属部材の背面周辺を押さえさせて、付属部材を液晶表示素子裏面に固着させるようにした。

【図２】



1…フレーム　2…爪　3…孔　4…ピン　5…プリント基板
6…液晶表示素子

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【特許請求の範囲】

【請求項1】液晶表示素子の背後に配置するプリント基板などの付属部材を、その背面周辺で押さえて固定するために、液晶表示素子の画像表示面の周辺を囲むフレームから上記背面を越えて突出している爪の端部の近くに、それぞれ孔を設け、各孔に、周辺外側から、それぞれ、先細のピンを挿入し、孔を通過したピンの端部側で付属部材の背面周辺を押さえさせて、付属部材を液晶表示素子裏面に固着させたことを特徴とする液晶表示装置。

【請求項2】弾性のある金属の板材を曲げて形成した中空ピンを用いたことを特徴とする請求項1記載の液晶表示装置。

【請求項3】先細のピンの断面が爪の孔の断面より大きくなった個所の太い側に溝状段差部を設け、そこでのピンの断面を爪の孔の断面より僅かに大きい程度に、少なくともピンの先細側に対しては急激に縮小させ、ピンの抜止め作用を行わせるようにしたことを特徴とする請求項1記載の液晶表示装置。

【請求項4】フレームの爪に設けた孔の周縁部の画像表示面に近い側は、固定すべき付属部材の背面より画像表示面に近く位置するようにしたことを特徴とする請求項1記載の液晶表示装置。

【請求項5】ピンの断面輪郭およびフレームの爪に設けた孔の輪郭が、それぞれほぼ同様な四角形に形成されていることを特徴とする請求項1記載の液晶表示装置。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、組立作業性を向上させ、分解、修理にも便利な構造の液晶表示装置に関する。

【0002】

【従来の技術】従来は、図5（a）に背面図を、図5（b）に側面図を示すように、液晶表示装置の液晶表示素子6の背後にプリント基板5などの付属部材を固定するために、液晶表示素子6の画像表示部を囲むフレーム1の、付属部材の背後側に突出した爪2の端部の近くに切り込み7を設け、爪2の切り込み7から端部までの部分を、付属部材の背面周辺を押さえ込むように図示のように曲げて、付属部材を固定していた。なお、図（b）中では、フレーム1自体の材料の厚さなどの細部を無視している。

【0003】

【発明が解決しようとする課題】しかし、上記のような従来の構造では、液晶表示装置を分解する必要が生じたとき、例えば修理したいときに、一旦折り曲げたフレームの爪の端部を、逆方向に曲げて、曲げる前の形に戻そうとしても、曲がり目部分の材料が時効硬化などにより硬化してしまっているために、曲げ戻しが困難で、時には、切り込み部から折れて切れてしまい、フレーム全体

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を取替える必要が生ずるようになることが少なくなかった。また、付属部材の厚さと、フレームの爪に設ける切り込み部の位置の関係が微妙で、切り込み部から上を曲げても、曲げた部分と付属部材背面の間に僅かな隙間が残存してガタつき易いなどの問題もあった。

【0004】本発明は上記のような問題が生じないようにした、分解時にフレームを損傷することなく容易に分解できる液晶表示装置を提供することを課題とする。

【0005】

【課題を解決するための手段】上記課題を解決するために本発明においては、液晶表示素子の背後に配置するプリント基板などの付属部材を、それらの背面周辺で押さえて固定するために、液晶表示素子の画像表示面の周辺を囲むフレームの、付属部材の背面を越えて突出している爪の端部の近くに、それぞれ孔を設け、各孔に、周辺外側から、それぞれ、先細のピンを挿入し、孔を通過したピンの端部側で付属部材の背面を押さえさせて、付属部材を固着させるようにした。そのために用いるピンには、線材から製作したものを用いるか、又は、ピン挿入時にピンの断面が比較的容易に弾性的に縮小変形するように、断性のある金属の板を曲げて中空に形成したものを用いる。また、先細のピンの断面が爪の孔の断面より大きくなった個所の太い側に溝状段差部を設け、そこでのピンの断面を爪の孔の断面より僅かに大きい程度に、少なくともピンの先細側に対しては急激に縮小させ、ピンの抜止め作用を行わせるようにした。更に、ピンの断面輪郭および爪に設けた孔の輪郭を、それぞれほぼ同様な四角形に形成させた。

【0006】

【作用】上記のようにすれば、フレーム周辺から画像表示部の背後側に伸びる爪の先が分解作業中に折れて、フレーム全体を取替えなければならなくなると言うような問題はなくなる。フレームの材料を比較的強度の高いものとし、ピンを比較的軟らかい塑性変形し易い材料で作れば、ピン材料が線材の場合に、ピンを強く押し込むことによって、フレームの爪の孔にピンの断面形状が変形して良く馴染み、ピンは抜け難くなる。また、ピンを弾性のある金属板を中空に曲げて製作した場合、ピンを押し込む時に断面形状が弾性的に変形して、フレームの爪の孔に押し込み易くなる。しかし、此の場合はピンに抜け止め用の溝状段差部を設けておく方が安全で、また、金属板材を用いている場合には、上記段差部を形成させる加工作業は容易である。なお、本発明による場合、フレームの爪に設けた孔の周縁部の画像表示面に近い側は、固定すべき付属部材の背面より必ず画像表示面に近く位置するようにしておけば、ピンを孔に挿入したときに、製造ロットの相違などにより部材の寸法に僅かな相違があっても、ピンによって確実に付属部材を押さえ付けることができる。なお、本発明に係るピンの断面形状が、フレームの爪の孔に対して回転し易い形状である

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と、抜け易くなったりする恐れがあるから、断面を双方とも、ほぼ四角にした。これは、三角では角の形状に、孔とピンとで僅かな相違があっても使用し難くなり、また、このような小さな寸法のもので四角以上の多角形断面にすると実際上円形と同様になってしまうからである。

【0007】

【実施例】図1は本発明第1実施例で、液晶表示素子6の背面にプリント基板5を配置してあり、それを固着させるために、画像表示面の周辺を囲むフレーム1の、背後側へ伸びた爪2の端部に、先細にしたピン4を挿入するための孔3が設けてある状態を示す図で、図（a）は背面図、図（b）は側面図である。図2は第1実施例のフレーム1の爪2の端部の四角な孔3の近傍と、その爪2の孔3に挿入すべき四角錐状ピン4の、拡大斜視図である。ピン4は図中の矢印方向に挿入する。本実施例では、フレームは鋼板で製作し、ピン4は銅などを含む比較的軟らかい合金で製作した。

【0008】図3は本発明第2実施例に用いる、金属板から製作したピン4aの中空断面を示す図である。図に示すように、容易に変形することを狙って断面を中空にしたのであるから、四辺が完全に囲まれている必要はなく、断面をコ字状またはU字状にした方が製作し易く、しかも使用上も問題はない。この実施例の場合、フレーム1の爪2の孔3は、ほぼ完全に四角い孔であるが、ピン4aの断面の方は、孔の中で回転しない程度に角張っているだけで、角の部分はかなり丸みを帯びていても差支えない。またこのような断面形状が容易に変形するピン4aを用いる場合は、ピンに抜け止め用の溝状段差部

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8を設けておく方が良い。図4はそのような段差部の形状の一例を示す側面図であるが、かかる形状に厳密に製作する必要はなく、また、段差の大きさは僅かで差支えなく、要は、この段差部によってピンが抜け難くなれば良い。

【0009】

【発明の効果】以上説明したように本発明によれば、分解や修理が容易で、フレームなどの部材はそのまま再利用できる、液晶表示装置が得られる。

【図面の簡単な説明】

【図1】本発明第1実施例で、未だピンを挿入していない状態を示し、図（a）はその背面図、図（b）は側面図である。

【図2】第1実施例のフレームの爪の端部の四角な孔の近傍と、その爪の孔に挿入すべき四角錐状ピンの、拡大斜視図である。

【図3】本発明第2実施例に用いる金属板から製作したピン4aの中空断面を示す図である。

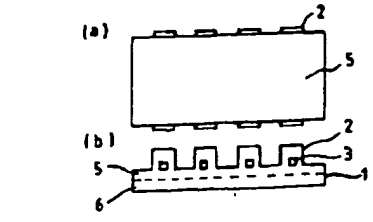
【図4】第2実施例に係るピン4aに設ける抜け止め用の溝状段差部8を示す図である。

【図5】従来の液晶表示装置で、液晶表示素子6の背面にプリント基板5を固着させるためにフレーム1の爪2の切り込み部7から端部側の部分を内側へ曲げた状態を示す図で、図（a）はその背面図、図（b）は側面図である。

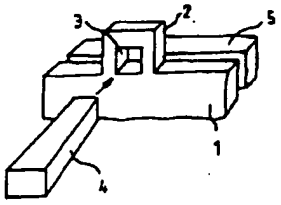
【符号の説明】

1…フレーム、　2…爪、　3…爪の端部近傍に設けた孔、　4、4a…ピン、　5…プリント基板、　6…液晶表示素子、　7…切り込み、　8…溝状段差部。

【図1】

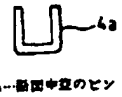


【図2】



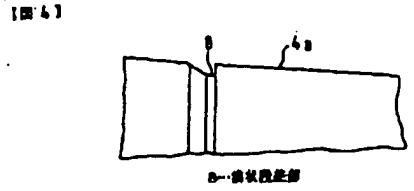
1…フレーム　2…爪　3…孔　4…ピン　5…プリント基板
6…液晶表示素子

【図3】



4a…図3中空のピン

【図4】



【図5】